PATENT CLAIMS

1. A transmitting unit within a communications system where at least some part of the transmission is executed by means of radio waves and in cells, and where symbols are transmitted by means of Orthogonal Frequency Divisional Multiplexing, so called OFDM-technology, between a transmitting unit and a receiving unit, at which the symbol transmission is executed over a transmission channel in blocks of binary digits and with a guard interval GI between said blocks, c h a r a c t e r i z e d in that said transmitting unit is equipped with means to control the length of the guard interval (GI) with regard to the size of the cell in which transmitting unit is located.

2. The transmitting unit as claimed in patent claim 1, c h a r a c t e r i z e d in that said means to control the length of the guard interval (GI) includes a guard interval adjustment unit (310) including an adjustable guard interval parameter.

3. The transmitting unit as claimed in patent claim 2, c h a r a c t e r i z e d in that said guard interval parameter can be changed via handling/managing system SNMP.

4. The transmitting unit as claimed in patent claim 2, c h a r a c t e r i z e d in that said guard interval adjustment unit (310) calculates a guard interval with regard to the size of the current cell.

5. The transmitting unit as claimed in patent claim 2 where the guard interval has been adjusted to the size of the cell in such a way that the length of the guard

interval in nanoseconds is set to, in the main, six times the cell radius in meters, that is, for a cell with the radius 100 meters, the length of the guard interval is set to/at 600 nanoseconds.

6. The transmitting unit as claimed in patent claim 3, c h a r a c t e r i z e d in that said guard interval adjustment unit (310) also takes into consideration the impulse response of the transmission channel.

7. A receiving unit within a communications system as claimed in patent claim 1, c h a r a c t e r i z e d in that the receiving unit is equipped with an adjustment module which adjusts the receiving unit according to the current guard interval in the cell.

8. The receiving unit as claimed in patent claim 7, c h a r a c t e r i z e d in that said adjustment is made through/by an operator.

9. The receiving unit as claimed in patent claim 7, c h a r a c t e r i z e d in that, at said adjustment, an algorithm which includes the following step is used:
- estimation of received guard interval.

10. The receiving unit as claimed in patent claim 9, c h a r a c t e r i z e d in that said estimation is made by calculating an estimate of the difference between received and expected block start point of time, the so called "coarse framing offset" $\hat{\delta}_{\text{int}}$ according to the formula:

$$\hat{\delta}_{\text{int}} = \arg\min_{n} \left\{ \frac{1}{G} \sum_{l=0}^{G-1} \left| |y_{i,l+n}|^2 - |y_{i,l+n+N}|^2 \right| \right\}$$

where n=0,1,2,.., 2G + 2N -1 and G indicates the sample length at the guard interval. y_i indicates the received signal of the i:th OFDM-symbol in the time domain.

11. A method within a communications system where at least some part of the transmission is executed by means of radio waves and in cells, and where symbols are transmitted by means of Orthogonal Frequency Divisional Multiplexing, so called OFDM-technology, between a transmitting unit and a receiving unit, at which the transmission of symbols is executed over a transmission channel in blocks of binary digits with a guard interval GI between said blocks, where said method includes the following steps:
    - estimation (510) of channel characteristics, also including production of/finding the size of the cell;
    - estimation (520) of least possible guard interval length which gives rise to an intersymbol interference within acceptable limits;
    - production (530) of/finding guard interval parameter based on said guard interval length;
    - incorporation (540) and use of said guard interval parameter at transmission of symbols from said transmitter.

12. Method as claimed in patent claim 11, where said estimation of channel characteristics also includes production of/finding impulse response of the channel.

13. A method at a communications system as claimed in patent claim 11, including:
    - estimation of received guard interval.

14. A method as claimed in patent claim 13 where said estimation is constituted by one by operator decided guard interval.

15. A method as claimed in patent claim 13 where said estimation is executed by calculating an estimate of the difference between received and expected block start point of time, the so called "coarse framing offset" $\hat{\delta}_{int}$ according to the formula:

$$\hat{\delta}_{int} = \arg\min_{n} \left\{ \frac{1}{G} \sum_{l=0}^{G-1} \left| |y_{i,l+n}|^2 - |y_{i,l+n+N}|^2 \right| \right\}$$

where n=0,1,2.., 2G + 2N -1 and G indicates the length of sample at the guard interval. y_i indicates the received signal for/of the i:th OFDM-symbol in the time domain.

16. A method within a communications system where at least some part of the transmission is executed by means of radio waves and in cells, and where symbols are transmitted by means of Orthogonal Frequency Divisional Multiplexing, so called OFDM-technology, between a transmitting unit and a receiving unit, at which the symbol transmission is executed over a transmission channel in blocks of binary digits with a guard interval GI between said blocks, where said method includes that the length of the guard interval GI is controlled with regard to the size of the cell in which transmitting unit is located.

17. A method as claimed in patent claim 16 where the length of the guard interval GI in nanoseconds is set to/at, in the main, six times the cell radius in meters, that is, for a cell with the radius 100

meters, the length of the guard interval GI is set to/ at 600 nanoseconds.

18. A communications system where at least some part of the transmission is executed by means of radio waves and in cells, and where symbols are transmitted by means of Orthogonal Frequency Divisional Multiplexing, so called OFDM-technology, between a transmitting unit and a receiving unit, at which the symbol transmission is executed over a transmission channel in blocks of binary digits with a guard interval GI between said blocks, c h a r a c t e r i z e d in that said system is equipped with means to control the length of the guard interval (GI) with regard to the size of the cell in which transmitting unit is located.